

1. The concentration of cholesterol (a type of fat) in the blood is associated with the risk of developing heart disease, such that higher concentrations of cholesterol indicate a higher level of risk, and lower concentrations indicate a lower level of risk. If you lower the concentration of cholesterol in the blood, your risk of developing heart disease can be reduced. Being overweight and/or physically inactive increases the concentration of cholesterol in your blood. Both exercise and weight loss can reduce cholesterol concentration. However, it is not known whether exercise or weight loss is best for lowering cholesterol concentration. Therefore, a researcher decided to investigate whether an exercise or weight loss intervention is more effective in lowering cholesterol levels. To this end, the researcher recruited a random sample of inactive males that were classified as overweight. This sample was then randomly split into two groups: Group 1 underwent a calorie-controlled diet and Group 2 undertook the exercise-training programme. In order to determine which treatment programme was more effective, the mean cholesterol concentrations were compared between the two groups at the end of the treatment programmes.
2. A group of Sports Science students ($n = 20$) are selected from the population to investigate whether a 12-week plyometric-training programme improves their standing long jump performance. In order to test whether this training improves performance, the students are tested for their long jump performance before they undertake a plyometric-training programme and then again at the end of the programme.
3. A researcher is planning a psychological intervention study, but before he proceeds he wants to characterise his participants' depression levels. He tests each participant on a particular depression index, where anyone who achieves a score of 4.0 is deemed to have 'normal' levels of depression. Lower scores indicate less depression and higher scores indicate greater depression. He has recruited 40 participants to take part in the study. Depression scores are recorded in the variable. He wants to know whether his sample is representative of the normal population.
4. A manager wants to raise the productivity at his company by increasing the speed at which his employees can use a particular spreadsheet program. As he does not have the skills in-house, he employs an external agency which provides training in this spreadsheet program. They offer 3 courses: a beginner, intermediate and advanced course. He is unsure which course is needed for the type of work they do at his company, so he sends 10 employees on the beginner course, 10 on the intermediate and 10 on the advanced course. When they all return from the training, he gives them a problem to solve using the spreadsheet program, and times how long it takes them to complete the problem. He then compares the three courses (beginner, intermediate, advanced) to see if there are any differences in the average time it took to complete the problem.
5. A researcher was interested in whether an individual's interest in politics was influenced by their level of education and gender. They recruited a random sample of participants to their study and

asked them about their interest in politics, which they scored from 0 to 100, with higher scores indicating a greater interest in politics. The researcher then divided the participants by gender (Male/Female) and then again by level of education (School/College/University). Therefore, the dependent variable was "interest in politics", and the two independent variables were "gender" and "education".

6. A salesperson for a large car brand wants to determine whether there is a relationship between an individual's income and the price they pay for a car. The salesperson wants to use this information to determine which cars to offer potential customers in new areas where average income is known.
7. Medical researchers might administer various dosages of a certain drug to patients and observe how their blood pressure responds.
8. A school system is exploring four methods of teaching reading to their children, and would like to determine which method is best. It selects a random sample of 40 children and randomly divides them into four groups, using a different teaching method for each group. The reading score of each of the children after a month of training is given in Figure 1. Before doing the analysis one of the researchers postulated that the scores of the children would be influenced by the income of their families, speculating that children from higher-income families would do better on the reading tests no matter which teaching method was used, and so this factor should be taken into account when trying to determine which teaching method to use. The family income (in thousands of dollars) for each of the children in the study is also given in Figure 1. Based on the data, is there a significant difference between the teaching methods?

	A	B	C	D	E	F	G	H	I	J
3		Score					Income			
4										
5		Method 1	Method 2	Method 3	Method 4		Method 1	Method 2	Method 3	Method 4
6		12	45	20	12		17.5	70.8	71.4	35
7		39	37	42	10		104.6	45.9	55	33
8		36	13	31	19		64.7	47.5	54	34.2
9		17	50	24	18		47	77.8	27.9	43.2
10		25	35	15	14		22	70.9	40.6	20
11		15	40	13	8		12.4	84.8	33	37
12		8	33	9	7		20	49.8	22.2	28.2
13		31	17	21	19		79.7	34.6	80.5	46.4
14				31	25				80	64.9
15				13	26				41	59.4
16	mean	22.875	33.75	21.9	15.8		45.9875	60.2625	50.56	40.13
17	var	134.125	164.78571	105.65556	44.844444		1159.0784	324.43411	449.52044	189.25344

9. Agricultural scientists might use different amounts of fertilizer and water on different fields and see how it affects crop yield.